ASTR 470: Solar System Physics

Syllabus - Fall 2012 Semester

AS OF 20 August 2012 - CHECK REGULARLY FOR CHANGES

INSTRUCTOR: Dr. David Alexander, HBH358[1] (x3633, dalex@rice.edu

CLASS TIME/LOCATION: Tuesday/Thursday, 9:25am-10:40am; HBH 453

CLASS WEBSITE: See Class website on OwlSpace It is the student's responsibility to participate via the class website and to check it regularly for updated information.

OFFICE HOURS: anytime by (email) appt.

OBJECTIVES and LEARNING OUTCOMES: The main objective is to introduce seniors and graduate students to some of the fundamental physical processes at work in the Solar System. The basic theme behind the course is to identify current problems of interest to modern solar and planetary science and to explore the physics behind them. The mathematical formulation of the physics will be put in context with the research applications to help familiarize the students with the research process. Regular class lectures will be augmented by the occasional discussion topic and one of the homeworks will involve the reading and summarizing of a relevant research paper.

Students will leave the class with an understanding of some of the fundamental processes that govern the physics of the Sun and its interactions with the planets of the solar system. The class provides rudimentary introduction to plasma physics, physics of radiation, and planetary magnetic fields that provide a backdrop to the more specialized graduate classes on these topics. In addition, students will gain a better understanding of the Earth's space environment and its impact on robotic and human space flight.

This course will only succeed with feedback (including criticism) from the class participants. I am looking forward to active participation and healthy discussion.

PRE-REQUISITES: Understanding of undergraduate electrodynamics, electromagnetism, quantum mechanics (atomic physics) and the appropriate mathematics (calculus, differential equations, integral transforms). PHYS 301 and PHYS 302.

TEXT: There is no textbook for this class as no single book covers all of the topics. I will be providing class notes and additional material as merited. Suggestions for further reading will also be provided.

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FORMAT: An interactive lecture course with problem solving exercises (homework), reading of research papers, in-class discussion, and two in-class exams. Students are required to prepare for any designated discussion topic prior to attending class.

[1] I am moving office sometime in early September. Will post new room when this happens.

GRADING:

Task		Total Pts	Weighting
9 homeworks	=	500 pts	40%
1 mid-term test	=	100 pts	30%
1 end-of-term test	=	100 pts	30%
total	=	700 pts	100%

Final grade will be determined on total score with appropriate scaling. The letter grade will be determine from the following: >90% (**A**), 80%-90% (**B**), 70%-80% (**C**), 60%-70% (**D**), <60% (**F**)

HOMEWORK PROBLEMS: Nine homeworks will be assigned during the semester. Eight will consist of problems associated with the work discussed in class (50 points each). One will be based on the reading and review of a research or review paper (100 points). Each problem set is due a week after being assigned unless otherwise stated. Collectively, these count for 40 percentage points towards your course grade.

TESTS: There will be two in-class open note tests during the semester worth 100 pts each and each contributing 30% each to your final grade.

DEADLINES: ***Strictly Enforced!*** Requests for extensions must reach and be approved by the instructor **BEFORE** the due date!

HONOR CODE: It is expected that each student will attempt the problems assigned on their own. However, active discussion of the physics in the problems is allowed to attain a clearer understanding of the issues once the problem has been attempted to the best of each student's ability. On occasion I may specify one or more problems as being exempt from collaboration. These problems will be clearly identified. Check assignments section of website for copies of problem sets, due dates and additional information.

DATES TO NOTE:

Wed Sep 5 – **P&A Colloquium : Vahe Petrosian**
Wed Sep 11 - **Prof out of town. Class by Dr. Massimino (TBC)**
Wed Sep 12 – **GENE KRANZ Space Frontiers Lecture (http://spacefrontiers.rice.edu)**
Thu Oct 9 – **Test #1 (tentative)**
Thu Oct 11 – **Centennial Celebration (no class)**
Tue Oct 16 – **Prof. out of town (class TBD)**
Thu Nov 22 – **Thanksgiving (no class)**
Thu Nov 29 – **Test #2 and last class day**

SPECIAL NOTE: Any student with a documented disability seeking academic adjustments or accommodations is requested to speak with me during the first two weeks of class. All such discussions will remain as confidential as possible. Students with disabilities will need to also contact Disability Support Services in the Allen Student Center.